

REVISION OF SOME LOWER LIAS OSTRACODA FROM YORKSHIRE

by ALAN LORD

ABSTRACT. Lower Liassic Ostracoda from Redcar, Hotham, and Cliffe are described and assigned to 17 species belonging to 9 genera. This work is substantially a revision of the ostracods described by T. R. Jones (1872) and J. F. Blake (1876).

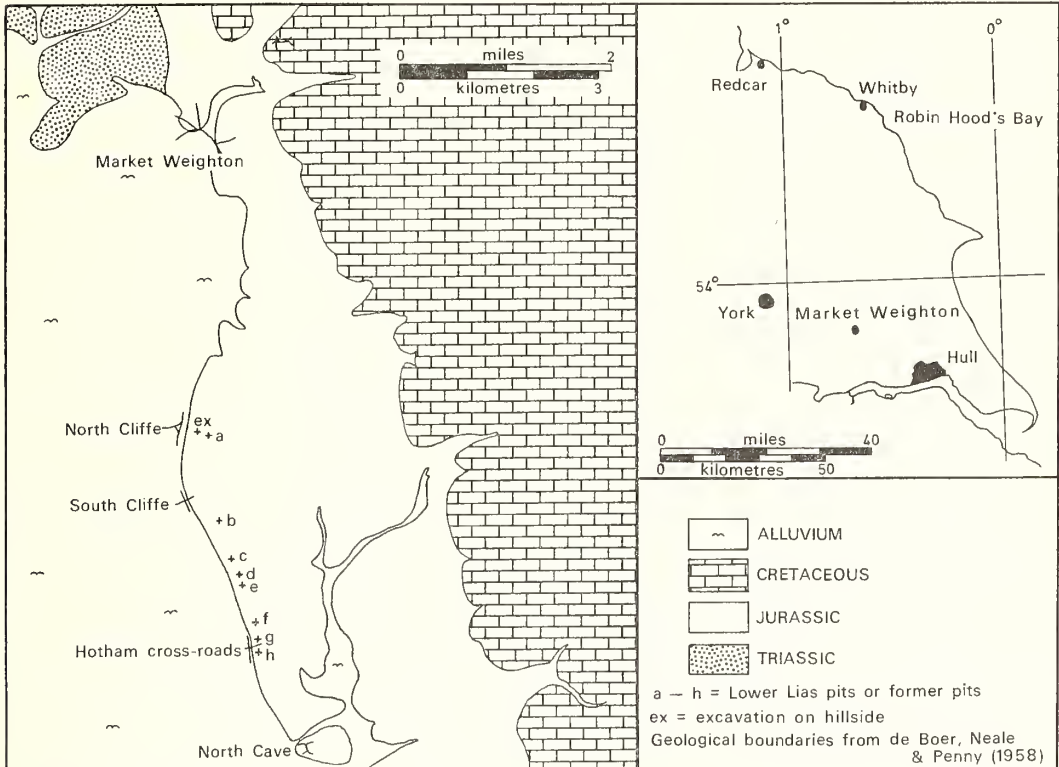
BRITISH Lower Jurassic ostracod faunas have received remarkably little attention from palaeontologists, our total knowledge consisting of 5 papers. Jones (1872) described 4 species from the 'Infralias' of East Yorkshire in an appendix to a stratigraphic account by Blake, and Blake (1876) described 16 species, mainly from Redcar, including the 4 species of Jones. A more general account of Rhaetic and Liassic ostracods was given by Jones (1894). Anderson (1964) discussed some Lower Jurassic species in a description of Rhaetic ostracods and has attempted to clarify the confusion caused by Jones (1894), who had inadvertently described some Purbeckian forms with Lower Jurassic and Rhaetic taxa. Hettangian Cytherellidae from the Dorset coast were described by Field (1966). Redescription of the species described by Jones (1872) and Blake (1876), all of which are from Yorkshire, has become necessary in view of the frequent reference to these taxa which has been made, often erroneously, by continental workers; the taxonomic discussion will serve to illustrate this point. The species of Jones (1872) lacked illustrations but are nevertheless valid; this omission was remedied by Blake (1876) who illustrated his species, and those of Jones, by line drawings. Although these drawings are usually quite good they have rather stylized ornament, are frequently very small, and should therefore be used with caution.

It must be emphasized that this paper is in no way a full record of Yorkshire Lower Lias ostracod faunas, but an account of the ostracods found in the 2 main areas from which Jones and Blake obtained their material. The excellent Lower Jurassic section in Robin Hood's Bay was not sampled.

Stratigraphy. Although the material described from Yorkshire by Jones and Blake came from a number of localities the majority of species came from 2 places: the foreshore scars at Redcar, and the area of North and South Cliffe and Hotham, which lie along the line of the Lower Lias escarpment between Market Weighton and the River Humber. Since no type specimens were defined, and since many of the species were recorded impartially from a number of places, it was felt that redescription from these 2 areas was justified by the large numbers of species which the sediments contained.

Samples were collected from sections between North Cliffe (SE 873370) and Hotham (SE 885335). The stratigraphy of the rocks in this area has been discussed by Blake (1872), Tate and Blake (1876), Fox-Strangways (1892), and Neale (in de Boer, Neale, and Penny 1958). Blake (1872, p. 140) figured a section showing the Cliffe area and indicating pits which exposed the lowest part of the Lower Lias. Of the 6 pits numbered, only 2 can

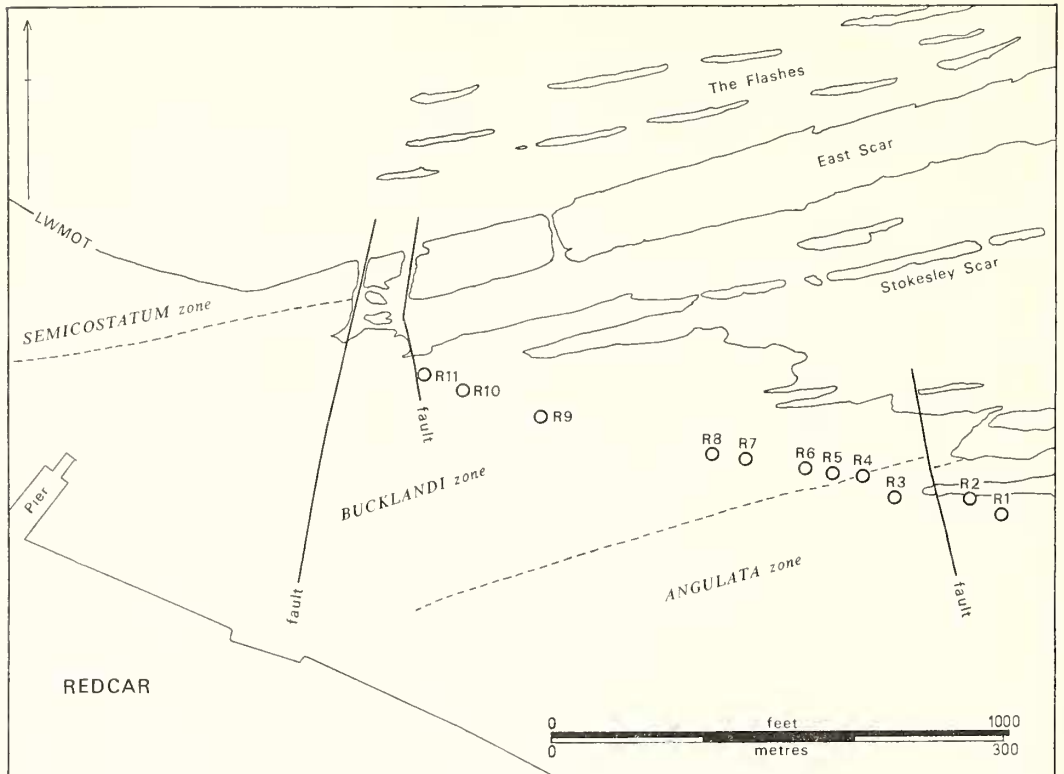
now be identified with any certainty—Nos. 5 and 6 in the north-east and south-east angles of Hotham crossroads (SE 884342 and SE 885339). Traces can be seen at the present time of some 8 pits along the scarp slope between North Cave and North Cliffe, of which the 2 southernmost are pits 5 and 6 of Blake. The Hotham pits are somewhat overgrown but expose pre-*planorbis* and *planorbis* zone beds; poor exposure, together



TEXT-FIG. 1. Location of sampled sites.

with failure to find zonal ammonites, makes it difficult to say which zones are represented in the higher strata. In his section Blake recorded the zones of *Ammonites planorbis* and *Ammonites angulatus*, while Neale (1958, p. 161) mentioned 6 feet of beds belonging to the zone of *Schlotheimia angulata* as the highest strata cropping out in the Cliffe area. Samples were taken from the pits labelled on text-fig. 1 as 'a', 'b', 'g', and 'h'. Pit 'a' is at the crest of the scarp above North Cliffe and the sample from this locality would appear to be stratigraphically the highest taken in this area.

The scars at Redcar provide the best exposures of lowest Lower Lias in the north of England. Unfortunately, this section has not been redescribed since the original account of Tate and Blake (1876), and when the samples were collected it was not found possible to follow their divisions. Professor D. T. Donovan and Mr. T. Getty are presently examining the *angulata* zone and have kindly commented upon the distribution of the samples. The beds belonging to the *angulata* zone are those to the south of 'Jenny



TEXT-FIG. 2. Zonal distribution of samples from Redcar.

Leigh's Scar' from which samples R1 to R4 were taken. 'Jenny Leigh's Scar' marks the base of the *bucklandi* zone and the remaining samples (R5 to R11) are from this zone or higher. When sampling was carried out exposure was limited by beach cover over the scars, and the *bucklandi* beds were more readily visible because they form more prominent scars. It is to be hoped that a full revision of this fine section will not be long delayed.

The residues from the 2 sample areas were generally quite rich in microfossils; foraminifera, ostracods, and holothurian spicules were often abundant in the Cliffe and Hotham material, while that from Redcar was usually moderately rich in foraminifera, ostracods, and (frequently) micro-gastropods. The microfauna of sample R7 was almost exclusively composed of micro-gastropods, and occurrences like this may suggest a possible brackish influence in the environment from time to time due to the proximity of a western land mass. The most common ostracods were members of the metacopid genus *Ogmoconcha*, an ubiquitous faunal element in the Lower and Middle Lias, which appears to have possessed the ability to tolerate a wide range of environment.

SYSTEMATIC PALAEOLOGY

Figured specimens are deposited in the collection of the Department of Geology, University of Hull, and bear the catalogue numbers of that collection. The classification employed is that of the several authors in Moore (1961, Treatise on Invertebrate Paleontology, part Q).

Subclass OSTRACODA Latreille 1806
 Order MYODOCOPIDA Sars 1866
 Suborder CLADOCOPINA Sars 1866
 Family POLYCOPIDAE Sars 1866
 Genus POLYCOPE Sars 1866

Type species. Polycope orbicularis Sars 1866.

Polycope cerasia Blake 1876

Plate 122, figs. 1, 2

1876 *Polycope cerasia* Blake, in Tate and Blake, p. 434, pl. 17, fig. 16.

1938 Ostracode (151), Wicher, pl. 27, fig. 9.

1961 *Polycope cerasia* Tate and Blake; Fischer, p. 500, fig. 1.

Material. 2 (?3) carapaces, 2 valves.

Distribution. Redcar, samples R4, 5, 8, 11.

<i>Dimensions</i> (in mm).		<i>Length</i>	<i>Height</i>	<i>Width</i>
Valve	HU.52.J.1	0.33	0.34	0.10
Carapace	HU.52.J.2	0.34	0.36	0.22

Diagnosis. As Blake (1876, p. 434).

Description. Shape sub-circular, slight cardinal angles on dorsal margin, anterior margin angled below mid-height at junction with ventral margin, other margins well rounded, although dorsal margin usually straight or only slightly convex. Valves uniformly inflated. Greatest height and width at about mid-height, greatest length at height of antero-ventral angle. Details of hingement, muscle-scars, and marginal zone not observed. Ornament essentially reticulate, but frequently in centre of valve walls of reticulations are thickened so that ornament is almost punctate; reticulation shows sub-concentric arrangement with elongation parallel to circumference at valve margins. In carapace, ornamentation of the 2 valves may differ slightly in strength of reticulation.

Remarks. This species was described from the *angulatus* and *bucklandi* zones at Redcar, a distribution in accord with the present record. In the Blake collection in the British Museum (Natural History) there are 5 specimens labelled ‘?Lower Lias, Redcar’ which vary slightly. These specimens are supposedly syntypes and 1 could be selected as lectotype, but in view of the doubtful origin of this material it would be preferred to erect as neotype 1 of the specimens described above which was collected at Redcar, the only original locality.

Blake’s original figure (1876, pl. 17, fig. 16) is misleading since it shows a perfectly round specimen with a coarsely punctate ornament and a marginal rim. On the specimens available from Redcar there was no trace of a marginal rim.

P. cerasia is distinguished from other Liassic species by its reticulate ornament; however, *P. pumicosa* Apostolescu from the *jamesoni* and *davoei* zones of the southern Paris Basin appears superficially similar in ornament from the illustration of the holotype (Apostolescu 1959, pl. 1, fig. 1). Further study might reveal a close relationship between the 2 species.

Order PODOCOPIDA Müller 1894
 Suborder PLATYCOPINA Sars 1866
 Family CYTHERELLIDAE Sars 1866
 Genus CYTHERELLA Jones 1849

Type species. *Cytherina ovata* Roemer 1840.

Cytherella drexlerae Field 1967

- 1958 *Cytherelloidea inflata* Drexler, p. 504, pl. 21, fig. 4 a-c.
 1966 *Cytherella inflata* (Drexler); Field, p. 96, pl. 13, figs. 19-22.
 1967 *Cytherella drexlerae* Field, p. 534.

Material. 3 male valves.

Distribution. Redcar, R6, 9, 11.

Diagnosis. As Field (1966, p. 96).

Remarks. The material is closely comparable to that described from England by Field (1966). The species differs from *Cytherella concentrica* Field (1966) only in as far as the latter possesses a reticulate ornament, and it is thought likely that the 2 species are sub-species of the same species.

Cytherella concentrica Field 1966

Plate 122, figs. 3, 4

- 1952 Ostracode 8, Usbeck, p. 406, pl. 18, fig. 65.
 1966 *Cytherella concentrica* Field, pp. 97-99, pl. 13, figs. 23-27.

Material. 3 carapaces, 1 valve.

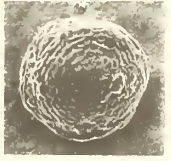
Distribution. Redcar, samples R6, 8, 10, 11; North Cliffe, pit 'a'.

<i>Dimensions</i> (in mm).		<i>Length</i>	<i>Height</i>	<i>Width</i>
Carapace	HU.52.J.3	0.70	0.42	0.26

EXPLANATION OF PLATE 122

All figures $\times 50$.

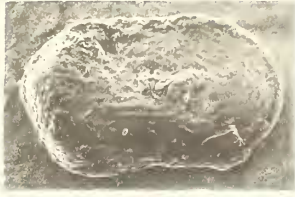
- Figs. 1, 2. *Polycope cerasia* Blake. Carapace, HU.52.J.2, Redcar—R5; 1, left view; 2, dorsal view.
 Figs. 3, 4. *Cytherella concentrica* Field. Carapace, HU.52.J.3, Redcar—R10; 3, right view; 4, dorsal view.
 Figs. 5-7. *Cytherelloidea pulchella* Apostolescu. 5, 7, Carapace, female, HU.52.J.9, pit 'a'; 5, left view; 7, dorsal view; 6, right valve, female, HU.52.J.8, pit 'a', external view.
 Figs. 8, 9. *Cytherelloidea circumscripta* (Blake). Carapace, female, HU.52.J.5, pit 'b'; 8, left view; 9, dorsal view.
 Figs. 10-12. *Bairdia* aff. *B. molesta* Apostolescu. 10, 12, Carapace, HU.52.J.11, pit 'b'; 10, right view; 12, dorsal view. 11, Right valve, HU.52.J.10, pit 'b', internal view.
 Fig. 13. *Bairdia* cf. *B. carinata* Drexler. Carapace, HU.52.J.13, Redcar—R11, left view.
 Figs. 14, 15. *Bairdia tatei* Coryell. Carapace, HU.52.J.15, Redcar—R8; 14, right view; 15, dorsal view.
 Figs. 16, 17. *Bairdiacypris? sartriensis* Donze. Left valve, HU.52.J.16, pit 'h'; 16, external view; 17, dorsal view.
 Figs. 18-21. *Klinglerella moorei* (Jones). 18, 20, Left valve, HU.52.J.60, pit 'b'; 18, external view; 20, dorsal view. 19, 21, Right valve, HU.52.J.61, pit 'b'; 19, external view; 21, dorsal view.



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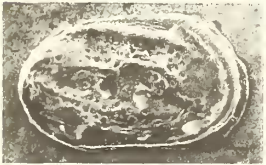
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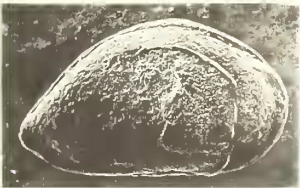
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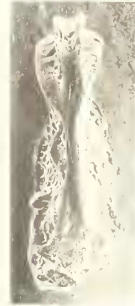
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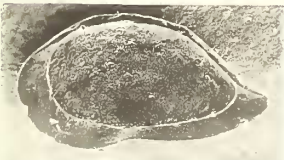
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Diagnosis and Description. As Field (1966, p. 97).

Remarks. Despite the presence of ornament, Field assigned this species to *Cytherella* on the grounds that in females there is only 1 posterior internal depression, whereas females of *Cytherelloidea* possess 2.

In certain respects the morphology of this species corresponds with the description of *Cythere blakei* Jones (1872) and it is possible that the 2 are synonymous.

C. concentrica was recorded from the *angulata* and *bucklandi* zones in Dorset but was found only in the *bucklandi* zone in Yorkshire. Blake (1876, p. 431) recorded *Cythere blakei* from the *plauorbis* zone at Cliffe and the *angulatus* zone at Redcar.

Genus CYTHERELLOIDEA Alexander 1929

Type species. *Cythere (Cytherella) williamsoniana* Jones 1849.

Cytherelloidea circumscripta (Blake 1876)

Plate 122, figs. 8, 9

1876 *Cytherella circumscripta* Blake, *in* Tate and Blake, p. 434, pl. 17, fig. 14.

1966 *Cytherelloidea circumscripta* (Blake); Field, pp. 88–93, pl. 11, figs. 1–8; pl. 12, figs. 9–13; text-fig. 2.

1966 *Cytherelloidea circumscripta* (Tate and Blake); Donze, p. 127, pl. 6, fig. 47.

1966 *Cytherelloidea cf. circumscripta* (Tate and Blake); Donze, pp. 127–128, pl. 6, fig. 46.

Material. 2 carapaces, 63 valves.

Distribution. Redcar, samples R2, 5, 10, 11. Hotham, pit 'h'. South Cliffe, pit 'b'. North Cliffe, pit 'a'

<i>Dimensions</i> (in mm).		<i>Length</i>	<i>Height</i>	<i>Width</i>
Left valve, female	HU.52.J.4	0.75	0.43	0.16
Carapace, female	HU.52.J.5	0.74	0.43	0.26
Left valve, male	HU.52.J.6	0.68	0.40	0.11
Right valve, male	HU.52.J.7	0.69	0.45	0.12

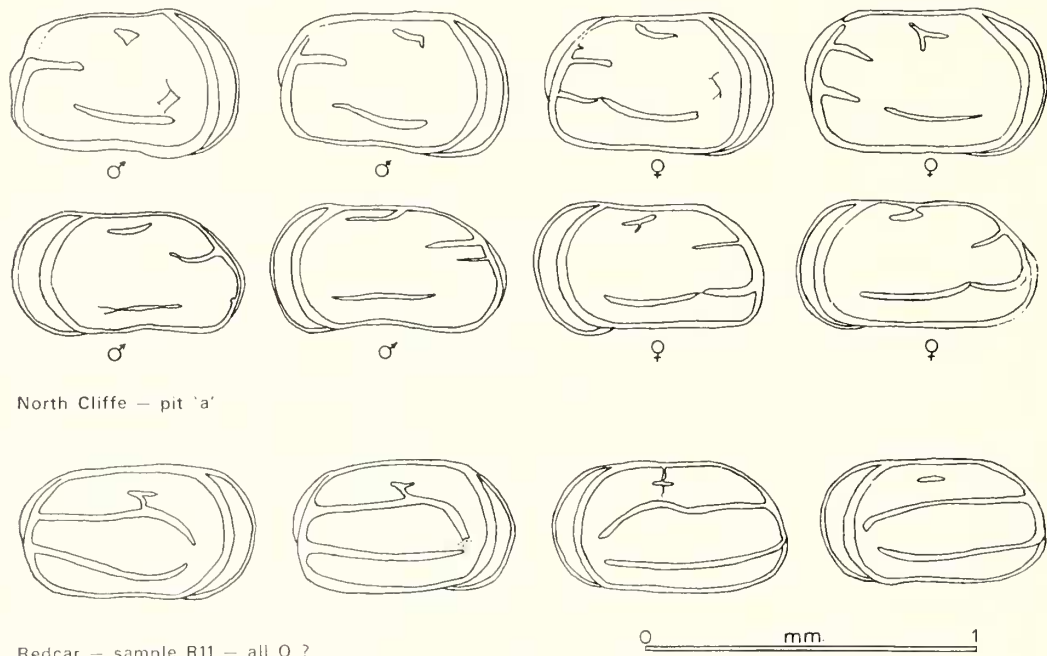
Diagnosis and description. Description by Blake (1876, p. 434), short diagnosis and description as Field (1966, p. 89). See text-fig. 3.

Remarks. *C. circumscripta* was described and discussed in some detail by Field (1966), who found distinct stratigraphic variation in ornament in the species in the Lower Lias of the Dorset coast. Ornamental differences between specimens, including both males and females, from Redcar and East Yorkshire are shown in text-fig. 3. Female specimens from East Yorkshire resembled Field's Variant II but often showed traces of an antero-medial rib which occurs in his Variant I and presumably represents an intermediate stage in development. Redcar specimens resembled Variant IV and all appeared to be female; they are certainly from a younger horizon than those from East Yorkshire. As Field noted, his Variant III most closely resembled the ostracod illustrated by Blake (1876, pl. 17, fig. 14). Sexual dimorphism is plainly discernible by ornamental differences and by the posterior inflation of the females, which is caused by 2 internal depressions, called 'brood cavities' by van Morkhoven (1963, p. 23).

Usbeck (1952, p. 404) placed this species in *Cytherelloidea* without any discussion. His specimens came from the Swabian Lias alpha 1–2 and from his figured specimen

(pl. 18, fig. 58a) the assignment is correct, but his fig. 58b is *Cytherelloidea pulchella* Apostolescu (1959). *Cytherelloidea valsoldensis* Conti (1954) seems to be the same as *C. circumscripta*.

The species, originally described from the *angulatus* zone at Redcar, was recorded by Field (1966) from the *angulata* and *bucklandi* zones of the Dorset coast, while the Yorkshire material was found in the *planorbis*, *angulata*, and *bucklandi* zones. The Yorkshire distribution is comparable with that of material from Siebeldingen/Pfalz described by Drexler (1958).



TEXT-FIG. 3. Ornamental variation in *Cytherelloidea circumscripta* (Blake).

Cytherelloidea pulchella Apostolescu 1959

Plate 122, figs. 5, 7

1959 *Cytherelloidea pulchella* Apostolescu, p. 802, pl. 1, figs. 4-6.

1964 *Cytherelloidea pulchella* Apostolescu; Contini and Pariwatvorn, p. 38, fig. 4.

1966 *Cytherelloidea pulchella* Apostolescu; Field, pp. 93-96, pl. 12, figs. 14-18.

1966 *Cytherelloidea buisensis* Donze, pp. 126-127, pl. 6, figs. 35-45.

Material. 1 carapace, 7 valves.

Distribution. Redcar, Sample R2. North Cliffe, pit 'a'. South Cliffe, pit 'b'. Hotham, pit 'h'.

<i>Dimensions</i> (in mm).		<i>Length</i>	<i>Height</i>	<i>Width</i>
Right valve, female	HU.52.J.8	0.61	0.36	0.12
Carapace, female	HU.52.J.9	0.65	0.38	0.24

Diagnosis. As Apostolescu (1959, p. 802).

Description. As Field (1966, p. 93).

Remarks. *C. pulchella* differs from *C. circumscripta* in its smaller size, more oval shape, and in the pattern of ornament—a feature more constant than in *C. circumscripta*, where ornament can vary with sex, valve, or horizon. The species has been recorded from the Rhaetic (Anderson 1964), Lias alpha (Usbeck 1952), *planorbis* zone (Donze 1966), *angulata* zone (Field 1966) and *bucklandi* zone (Apostolescu 1959). Donze's (1966, pp. 126–127) species *C. buisensis* differs in outline from the type and more closely resembles the illustration given by Anderson (pl. 13, figs. 74–78). These 2 records seem to represent a more primitive stage within the species. Anderson (p. 151) noted that this species may be the same as *Cythere terquemiana* Jones (1872), but it does not fit the original description and, as is described below, there is reason to suppose that specimens of *Cythere terquemiana* have been found in the type area.

It is tempting to identify *C. pulchella* with Blake's *Cytherella crepidula* (see Field 1966, p. 94) and similarities in shape and ribbing exist if the original drawing of *C. crepidula* is regarded as being somewhat impressionistic. However, *C. crepidula* was only recorded from 1 locality and 1 horizon (the *Ammonites capricornus* zone at Huntcliff, near Staithes), and this leaves a gap of over 1 stage between the highest record of *C. pulchella* and the recorded occurrence of *C. crepidula* in Yorkshire. The validity of this comparison can only be tested when original or topotype material of Blake's species has been found. The original material is missing and in the course of this study no examples were found.

Suborder PODOCOPINA Sars 1866
Superfamily BAIRDIACEA Sars 1888
Family BAIRDIIDAE Sars 1888
Genus BAIRDIA M'Coy 1844

Type species. *Bairdia curtus* M'Coy 1844.

Remarks. 36 specimens of this genus were found at Redcar. The species described below as *Bairdia tatei* Coryell (1963) was readily distinguishable, but the remaining specimens showed variation in shape and could not be assigned to existing species although, in certain respects, a few resembled *Bairdia molesta* Apostolescu (1959). Possibly 1 or 2 species are present and in view of their variation and poor state of preservation it is preferable to leave them under open nomenclature until more material is available. None of the specimens of *Bairdia* resembled *Bairdia? hettangica* Donze (1966) from the Hettangian of Ardèche.

Bairdia aff. *B. molesta* Apostolescu 1959

Plate 122, figs. 10–12

aff. 1959 *Bairdia molesta* Apostolescu, pp. 806–807, pl. 2, fig. 31.

Material. 1 carapace, 3 valves.

Distribution. South Cliffe, pit 'b'.

<i>Dimensions</i> (in mm).		<i>Length</i>	<i>Height</i>	<i>Width</i>
Right valve	HU.52.J.10	0.67	0.37	0.12
Carapace	HU.52.J.11	0.72	0.41	0.29

Discussion. In shape the specimens are very similar to *B. molesta*, but have a slightly more rounded aspect. While some variation in shape is found in *B. molesta* through its

range (Lower Sinemurian to Domerian), these specimens seem to represent a pre-*B. molesta* stage from which the species evolved during the late Hettangian, and they are accordingly placed as *B. aff. B. molesta*.

Bairdia cf. *B. carinata* Drexler 1958

Plate 122, fig. 13

cf. 1958 *Bairdia carinata* Drexler, pp. 512–513, pl. 22, figs. 2 a–c.

Material. 2 carapaces.

Distribution. Redcar, sample R11.

<i>Dimensions</i> (in mm).		<i>Length</i>	<i>Height</i>	<i>Width</i>
Carapace	HU.52.J.12	0.59+	0.31	0.22
Carapace	HU.52.J.13	0.65	0.31	0.24

Discussion. Both specimens have an extended posterior end and most closely resemble Drexler's pl. 22, fig. 2*b*; they are somewhat smaller than Drexler's specimens and may perhaps be instars, perhaps the moult stage immediately preceding the adult, or the one prior to that.

Bairdia tatei Coryell 1963

Plate 122, figs. 14, 15

1876 *Bairdia elongata* Blake, p. 431, pl. 17, fig. 5.

1963 *Bairdia tatei* Coryell, p. 462.

1966 *Isobythocypris?* *tatei* (Coryell); van den Bold, pp. 222–223.

?1959 ?*Isobythocypris elongata* (Tate and Blake); Apostolescu, p. 808, pl. 2, figs. 24, 25.

?1964 *Poutocyprilla elongata* (Blake); Contini and Pariwatvorn, figs. 4, 6, 8.

?1966 *Isobythocypris elongata* (Blake); Magné and Obert, pp. 267, 271.

non 1958 *Bythocypris* cf. *elongata* (Tate and Blake); Drexler, pp. 515–516, pl. 23, figs. 1 a–f; pl. 24, figs. 7–9; pl. 27, figs. 1, 2.

non 1964 *Hungarella elongata* (Blake); Anderson, pp. 148, 149; pl. 15, figs. 118–121.

Material. 5 carapaces, 1 valve.

Distribution. Redcar, samples R4, 5, 8.

<i>Dimensions</i> (in mm).		<i>Length</i>	<i>Height</i>	<i>Width</i>
Carapace	HU.52.J.14	0.72+	0.39	0.26
Carapace	HU.52.J.15	0.78	0.39	0.27

Diagnosis. As for *Bairdia elongata* Blake (1876, p. 431).

Description. Valves uniformly inflated with greatest width and height about mid-length, and greatest length just below mid-height. Left valve larger than right, which is overlapped dorsally and along mid-part of ventral margin. Dorsal margin gently arched but ventral margin straight with slight concavity just anterior of mid-length. Anterior margin evenly rounded, but posterior short and low and dorsal margin curves steeply down to meet it.

Internal details not seen, but on 1 carapace line of inner margin was visible, with narrow vestibule at anterior end and a few straight marginal pore canals.

Details of muscle-scars and hingement not seen. Valve surface smooth and unornamented.

Remarks. The specimens described were most closely comparable to Blake's species *B. elongata*. This species seems to be a genuine *Bairdia*; the forms preceded by an interrogation mark in the synonymy, however, apparently do not belong in that genus, because, from the illustrations available, they differ in shape, especially posteriorly. Many of the species in the synonymy seem to belong to the group discussed below as *Pontocyprilla*, but the situation is confused and the exact position of *Isobythocypris* within this group of smooth elongate-oval ostracods is obscure.

Anderson (1964, pp. 148, 149) described a species from the ? basal Lower Lias as *Hungarella elongata* (Blake) and also figured (pl. 15, fig. 119) a specimen as lectotype (BMNH Io3194, Blake Collection, *bucklandi* zone, Redcar). The evidence that this specimen is Blake's species is unconvincing, and it is unlike any species found from the Redcar samples, with the possible exception of *Ogmoconcha* sp. A. Comparison of Blake's figure (1876, pl. 17, fig. 5) with the lectotype, and with Anderson's figures (1964, pl. 15, figs. 118-121) of the lectotype and a specimen (GSM Mik (J) 285001) from the lowest Lower Lias of the Plattlane Borehole, Shropshire, is not sufficiently close to establish convincingly that they belong to the same species. Blake's figure shows a carapace which appears to be elongate-oval in shape with a straight dorsal margin which curves down to the low posterior; the ventral margin appears straight. The ventral and posterior margins merge into the dorsal margin, the anterior margin being essentially a continuation of the venter. The posterior end of the shell is rounded and rather acuminate, its most distal point being below mid-height. The larger left valve overlaps the right valve all round and no details of hingement, muscle-scars, or pore canals are visible. Blake's description (1876, p. 431) is vague: 'Carapace large, long, like a narrow bean; ends nearly alike, sharply curved; ventral side slightly concave, dorsal side greatly convex, not compressed.' The specimens described here are regarded as morphologically closer to *B. elongata* than the lectotype erected by Anderson. Anderson's figures show an ostracod which differs from *B. elongata* in possessing a more convex dorsal margin and differently shaped anterior and posterior ends. Admittedly, shape is not always a reliable criterion when knowledge of variation within the species is lacking, but in this case it provides the only evidence. Drexler (1958, pp. 515, 516) compared specimens from the Lias alpha 3 of Pfalz with this species and placed them in the genus *Bythocypris*, but Apostolescu (1959, p. 808) considered the species as possibly belonging to his new genus *Isobythocypris*. Several authors in the Lias Colloque (1961) called this species *Pontocyprilla elongata* (Blake) and were followed by Oertli (1963) and Contini and Pariwatvorn (1964), although Magné and Obert (1966) followed Apostolescu and used the name *Isobythocypris elongata* (Blake) for ostracods from the *oxynotum* zone of Arbois and the Domerian of Andelot in eastern France.

A complication is that numerous homonyms exist for *Bairdia elongata* and *Bythocypris elongata*. As has been shown by Coryell (1963) and van den Bold (1966), *Bairdia elongata* Blake is a homonym of *Bairdia elongata* (Münster 1830) and as such is not available for use, so that Coryell's new name *Bairdia tatei* Coryell (1963, p. 462) has priority over *Hungarella elongata* (Blake) of Anderson (1964, p. 148).

GENUS BAIRDIACYPRIS Bradford 1935

Type species. *Bairdiacypris deloi* Bradfield 1935.

Bairdiacypris? sartriensis Donze 1966

Plate 122, figs. 16, 17

?1952 Ostracode 2, Usbeck, p. 404, pl. 18, fig. 60.

1966 *Bairdiacypris? sartriensis* Donze, p. 131, pl. 7, figs. 81–86, table 2.*Material.* 1 valve (adult), 1 carapace (instar).*Distribution.* Hotham, pit 'h', *planorbis* zone.

<i>Dimensions</i> (in mm).		<i>Length</i>	<i>Height</i>	<i>Width</i>
Left valve	HU.52.J.16	0.75	0.35	0.14
Holotype, carapace (from Donze)		0.75	0.35	—

Diagnosis. Donze (1966, p. 131).

Description. Oval–elongate in shape; tripartite dorsal margin, anterior section inclined antero-ventrally, median section inclined slightly towards posterior, and posterior section short, curving round to merge with rounded posterior margin. Anterior margin low, rounded. Ventral margin medianly concave, giving sinuous outline to valve. Left valve larger than right, and overlaps it at anterior and posterior ends of dorsal margin and along mid-part of ventral margin. Greatest height at anterior end of mid-part of dorsal margin in larvae, but at about mid-length in adult; greatest length at mid-height and greatest width close to posterior end. Valve surface smooth, unornamented. Hinge in adult simple, adont. No details of muscle-scar pattern seen.

Remarks. The left valve was encrusted internally with small calcite crystals which obliterated any trace of muscle scars; the duplicature seemed to be very narrow, suggesting that the species does not belong to the family Bairdiidae.

The 2 specimens are closely comparable to the original figures of Donze (1966, pl. 7, figs. 81–86) and the adult has the same dimensions as the holotype (p. 131). The assignment of this species to *Bairdiacypris* may be correct; certainly it compares quite well with illustrations of the type species *B. deloi* from the Carboniferous, but it differs in its possession of a more rounded posterior margin.

Bairdia dispersa Blake (1876) may be the same as this species, although it comes from a higher horizon than any from which *B.? sartriensis* has been recorded. Ostracods from the Hognas Series of Scania were placed in *B. dispersa* by Troedsson (1951, p. 245) but the validity of the assignment is questionable.

Superfamily CYPRIDACEA Baird 1845

Family PARACYPRIDIDAE Sars 1923

Genus PARACYPRIS Sars 1866

Type species. *Paracypris polita* Sars 1866.*Paracypris* cf. *P.? semidisca* Drexler 1958cf. 1958 *Paracypris? semidisca* Drexler, pp. 519, 520, pl. 23, figs. 4a–d.1966 *Paracypris? cf. semidisca* Drexler; Donze, p. 132, pl. 7, figs. 69–74.*Material.* 1 left valve.*Distribution.* Redcar, sample R8.

Discussion. A single, poorly preserved, left valve with a broken posterior end. Dorsal margin convex, curving down to a low rounded anterior margin and to the acuminate posterior. Ventral margin almost rectilinear. Surface smooth and unornamented. No other details visible. Apparently belonging to *Paracypris*, this specimen most closely resembles Drexler's *P.?* *semidisca*. In her synonymy Drexler tentatively included *Bairdia lacrimae* Blake (mis-spelling for *B. lacryma*) but this differs in shape especially with regard to the posterior margin, which is distally extended in the original figure (Blake 1876, pl. 17, fig. 3). The identification of *B. lacryma* with *P.?* *semidisca* is a possibility but one which for the moment must remain unsettled. Barbieri (1964) compared ostracods from the top of the Carixian of Sicily with *B. lacryma* but from his illustration the identification seems doubtful.

Genus PONTOCYPRELLA Lyubimova 1955

Type species. *Bairdia harrisiana* Jones 1849.

A number of poor specimens from Redcar resemble in shape, overlap, and smooth valve surface the species *Pontocyprrella aureola* Lyubimova 1955 or *Pontocyprrella aktagensis* Mandelstam 1956; they resemble the type species less closely. More than 1 genus is represented by the species which have been placed in *Pontocyprrella*. As in other cases cited previously, any definitive naming of the material is precluded by the small number of poor specimens.

Superfamily CYTHERACEA Baird 1850

Family PROGONOCYTHERIDAE Sylvester-Bradley 1948

Genus KLINGLERELLA Anderson 1964

Type species. *Procytheridea glabellata* Klingler and Neuweiler 1959.

Remarks. *Klinglerella* was first described by Anderson (1964, p. 141), who questionably placed 2 Rhaetic species in the genus. However, in his discussion of the genus, Anderson noted a number of *Procytheridea* species, including many of those described by Klingler and Neuweiler (1959), which he believed to belong to *Klinglerella*. The genus appears to represent a varied and important Lower Lias group of ostracods, many of the species of which have been erroneously placed in *Procytheridea* in the past. The problem of *Procytheridea* will be discussed elsewhere; suffice it to say that *Procytheridea* does not occur in the Lower Jurassic or, probably, anywhere in Europe.

Klinglerella moorei (Jones 1872)

Plate 122, figs. 18–21

- 1872 *Cythere moorei*, G. S. Brady MS, Jones, p. 146.
 ?1908 *Bairdia moorei* Jones; Issler, p. 95, fig. 343, *non* 344.
 ?1952 Ostracode 4, Usbeck, pp. 404, 405, pl. 18, fig. 61*b*, *non* 61*a*, *c*, *d*.
 ?par. 1959 *Procytheridea luxuriosa* Apostolescu, pp. 808, 809, pl. 2, figs. 33–36.
 1966 *Procytheridea praeluxuriosa* Donze, pp. 133, 134, pl. 7, figs. 87–91.

Material. 2 carapaces, 17 valves.

Distribution. South Cliffe, pit 'b'.

Dimensions (in mm).		Length	Height	Width
Left valve	HU.52.J.58	0.49	0.30	0.14
Left valve	HU.52.J.59	0.52	0.31	0.15
Left valve	HU.52.J.60	0.50	0.28	0.15
Right valve	HU.52.J.61	0.53	0.26	0.14

Diagnosis. Jones (1872, p. 146).

Description. Shape oval. Dorsal margin straight or slightly convex and gently inclined towards posterior; posterior low and rounded, anterior margin almost straight and gently inclined downwards for short distance from anterior cardinal angle, then broadly rounded; ventral margin straight or slightly convex with median selvage groove evident in some specimens. In side view ventral margin hidden by ventral inflation. Valves inflated, with low rim bordering anterior margin, which is ornamented with a weak peripheral rib. This frequently has minor ribs running into it causing rim to be split up into small sections.

Left valve larger and higher than right. Greatest length at mid-valve height, greatest height at anterior cardinal angle, and greatest width medianly or postero-medianly. Valve surfaces ornamented with pattern of ribs which is essentially triangular, basal set being longitudinal with minor ribs and in centre an area of reticulate ornament produced by intersection of different rib trends. Ribs on ventral side of shell and on ventral surface of inflation are longitudinal. Posterior margin low, unornamented.

Hinge merodont; in left valve an anterior loculate groove with 6 sockets, median bar, and posterior loculate groove with 6 sockets; and in right valve an anterior dentate ridge, median groove, and posterior dentate ridge. Marginal zone moderately wide, inner margin and line of concrescence coincide. Marginal pore canals simple and straight. No sexual dimorphism evident.

Remarks. The species corresponds well with that described by Jones (1872). Blake (1876) quoted Jones in his re-description but added that the ornament was ‘. . . like parallel irregularly carved furrows’, and his illustration (pl. 17, fig. 9) does not really match the original description. It seems likely that Blake described a form which is close to, or identical with, the species described by Apostolescu (1959) as *Procytheridea luxuriosa*, from the Sinemurian (*bucklandi* and *semicostatum* zones) of the Paris Basin. 1 specimen close to this latter species was found at Redcar in the youngest fossiliferous horizon sampled (sample R11, left valve, HU.52.J.62, length 0.62 mm, height 0.35 mm, width 0.17 mm). At the type area (South Cliffe) *P. luxuriosa* was not found and the species described above, which fits Jones’s original description, must be taken as *Cythere moorei*. *Klinglerella moorei* is thought to be closely related to *P. luxuriosa*.

In the ‘Colloque sur le Lias Francais’ (1961) ostracods have been compared with this species by G. Bizon and Oertli (p. 116), G. Bizon (p. 436), Champeau (p. 438), and J. J. Bizon (p. 452). Their forms, illustrated by drawings and without descriptions, appear to show a significant similarity in outline and ornament to each other and to the species which is regarded here as *Klinglerella moorei*. The ostracod illustrated by Usbeck (1952, pl. 18, fig. 61b) from the Lias alpha of Swabia may well be *C. moorei*, but Usbeck’s photograph is poor and no firm decision is possible. Issler (1908, p. 95) placed the species in *Bairdia*, and Apostolescu (1959, p. 808) tentatively included it in *Procytheridea luxuriosa*.

Klinglerella aff. *K. triebeli* (Klingler and Neuweiler 1959)

Plate 123, figs. 1-3

aff. 1959 *Procytheridea triebeli* Klingler and Neuweiler, pp. 381, 382, pl. 13, figs. 11-16; pl. 14, figs. 17, 18.

Material. 4 carapaces, 34 valves.

Distribution. South Cliffe, pit 'b'. Redcar, sample R6.

<i>Dimensions</i> (in mm).		<i>Length</i>	<i>Height</i>	<i>Width</i>
Left valve, male	HU.52.J.17	0.59	0.33	0.16
Right valve, male	HU.52.J.18	0.61	0.32	0.14
Left valve, female	HU.52.J.19	0.50	0.31	0.13
Right valve, female	HU.52.J.20	0.51	0.29	0.14
Carapace, female	HU.52.J.21	0.53	0.32	0.27

Description. Shape oval; dorsal margin straight but inclined posteriorly; from dorsal cardinal angle anterior margin is straight and moderately inclined, then curves down, becoming rounded but slightly asymmetric. At its posterior end dorsal margin joins rounded posterior margin which in turn joins ventral margin; latter has median concavity and selvage groove. Shape of right, or smaller, valve differs a little from that of left, particularly in males which have rather more strongly angled dorsal margin. Left valve larger than right. Greatest length at, or just below, mid-height; maximum height just anterior of mid-length and maximum width medianly or just a little to posterior.

Slight ventral inflation evident. Sexual dimorphism present; presumed females shorter, higher, and appear more rounded than males. Anterior and posterior margins possess narrow bordering rims, rest of valve being inflated except for short groove which runs from near anterior end of dorsal margin for short distance in direction of antero-ventral margin. This groove may be weakly or strongly developed. Surface of valves ornamented with ribs forming an open reticulate pattern of 4 or 5 sided cells. Some ribs are rather strong and may be traced across valve. Towards margins ornament becomes weaker and may degenerate into weak punctuation. By nature of their preservation some specimens show little ornament even when stained.

Hinge hemimerodont; in left valve an anterior loculate groove, (?) smooth median bar, and posterior loculate groove, matched in right valve by an anterior dentate ridge, median furrow, and posterior dentate ridge. Median bar in left valve and median furrow in right valve may be respectively denticulate and locellate, but this is difficult to ascertain due to preservation and may mean that hinge is antimerodont rather than hemimerodont. Adductor muscle scar pattern a vertical row of 4 scars, largest being the central 2, with a single V-shaped frontal scar.

Normal pore canals simple, about 45 in number, fairly evenly distributed over valve surface. Marginal pore canals few, short, straight. Marginal zone quite wide anteriorly, less so on ventral and posterior margins; line of concrescence and inner margin coincident. Sexual dimorphism apparent.

Remarks. This record is from an horizon lower than that given for *K. triebeli* by Klingler and Neuweiler (1959). The specimens are also smaller than the type material. For these reasons and also because of the poor ornamentation on some of the specimens, these ostracods are regarded as *K. aff. K. triebeli* rather than *Klinglerella triebeli* [*sensu stricto*].

The smooth nature of some of the specimens may suggest a comparison with *Cythere blakei* Jones despite differences from the original description.

This group of ostracods differs from *Klinglerella moorei* in shape, ornament and the presence of dimorphism.

The specimens from Redcar are more inflated than those from Cliffe and may not belong to the same taxon.

Klinglerella? translucens (Blake 1876)

Plate 123, figs. 4, 5

- 1876 *Cythere translucens* Blake, pp. 432, 433, pl. 17, fig. 10.
 1923 *Bairdia translucens* (Tate and Blake); Pratje, p. 253.
 non 1908 *Bairdia translucens* (Tate and Blake); Issler, p. 94, fig. 340.

Material. 3 carapaces, 2 valves.

Distribution. Redcar, sample R6.

<i>Dimensions</i> (in mm).		<i>Length</i>	<i>Height</i>	<i>Width</i>
Carapace	HU.52.J.22	0.62	0.34	0.28
Carapace	HU.52.J.23	0.65	0.34	0.29

Diagnosis. Blake (1876, pp. 432, 433).

Description. Shape elongate, oval-triangular. Dorsal margin rectilinear and inclined posteriorly from anterior margin. Ventral margin straight, but obscured in lateral view by weak ventral inflation. Posterior margin short, rounded, slightly asymmetric. Anterior and posterior margins have bordering rims, while rest of valve is gently inflated with exception of flatter area in antero-dorsal position.

Left valve larger than right. Position of greatest height at anterior cardinal angle, of greatest length slightly below mid-height, and of greatest width posteriorly. Valve surfaces irregular with no distinct ornament discernible except on ventral sides of ventral inflations where weak longitudinal ribs may be observed. Some surface irregularities may be expression of normal pore canals. No internal features observed.

EXPLANATION OF PLATE 123

All figures $\times 50$.

- Figs. 1-3. *Klinglerella* aff. *K. triebeli* (Klingler and Neuweiler). 1, Left valve, female, HU.52.J.19, pit 'b', external view. 2, 3, Right valve, male, HU.52.J.18, pit 'b'; 2, external view; 3, dorsal view.
 Figs. 4, 5. *Klinglerella? translucens* (Blake). 4, Carapace, HU.52.J.22, Redcar—R6, left view. 5, Carapace, HU.52.J.23, Redcar—R6, dorsal view.
 Figs. 6-8. '*Cythere*' *terquemiana* Jones. 6, Left valve, HU.52.J.25, pit 'b', external view. 7, 8, Left valve, HU.52.J.24, pit 'b'; 7, external view; 8, dorsal view.
 Figs. 9-13. *Ogmoconcha ellipsoidea* (Jones). 9, Left valve, HU.52.J.32, pit 'g', external view. 10, Right valve, HU.52.J.33, pit 'g', external view. 11, Right valve, HU.52.J.37, pit 'a', internal view. 12, Left valve, HU.52.J.36, pit 'a', internal view. 13, Carapace, HU.52.J.30, pit 'g', dorsal view.
 Figs. 14-16. *Ogmoconcha hagenowi* Drexler. 14, Left valve, HU.52.J.50, Redcar—R9, external view. 15, Right valve, HU.52.J.49, Redcar—R9, external view. 16, Carapace, HU.52.J.44, Redcar—R8, dorsal view.
 Figs. 17, 18. *Ogmoconcha* sp. A. 17, Left valve, HU.52.J.55, Redcar—R6, external view. 18, Carapace, HU.52.J.53, Redcar—R6, right view.



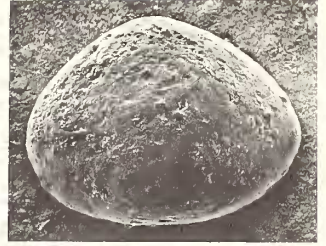
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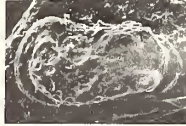
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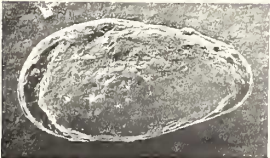
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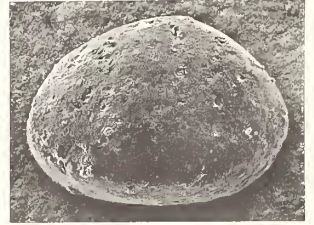
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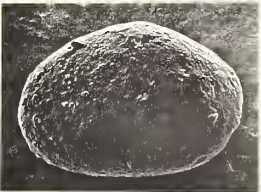
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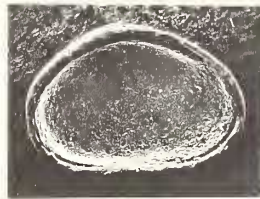
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Remarks. The weak or indeterminate ornament precludes a firm specific identification since the original description mentions a network of distinct ribs. Nevertheless, the original figure shows an ostracod with an irregular surface, and whilst the original figure and description may not be reliable, for the present these specimens are placed in *C. translucens* because of their similarity to the original figure and their occurrence in the *bucklandi* zone at Redcar. The material differs from any of the species described by Klingler and Neuweiler (1959). Issler (1908, p. 94) assigned this species to the genus *Bairdia*.

Family Uncertain

Remarks. The species described below is considered to belong to a new and undescribed genus. Since only 2 specimens were found the original nomenclature of Jones (1872) has been retained pending collection of more material.

'*Cythere*' *terquemiana* Jones 1872

Plate 123, figs. 6-8

1872 *Cythere terquemiana* Jones, p. 147.

1876 *Cythere terquemiana* Jones; Blake, p. 432, pl. 17, fig. 7.

Material. 2 valves.

Distribution. South Cliffe.

<i>Dimensions</i> (in mm).		<i>Length</i>	<i>Height</i>	<i>Width</i>
Left valve	HU.52.J.24	0.45	0.24	0.10
Left valve	HU.52.J.25	0.45+	0.26	0.11

Diagnosis. Jones (1872, p. 147).

Description. Shape sub-rectangular. Dorsal margin concave, margin being highest at anterior cardinal angle; anterior margin broadly rounded; ventral margin slightly concave; posterior rounded with an angulation at mid-height. Anterior and posterior margins bordered by low flat rims. Anterior marginal rim has low peripheral rib with minor ribs running from it in posterior direction, thus subdividing rim into approximately 9 small cells. Posterior rim is flat, unornamented. Rest of valve inflated, except for sulcus, which starts from antero-median part of dorsal margin, behind inflated and raised area at anterior cardinal angle, and runs down to antero-median area of valve. Surface of inflated area irregular, with tubercle at postero-ventral extremity, whilst traces of another (which does not appear to be an eye-spot) exist at anterior cardinal angle, and postero-dorsal area is a complex ridged region which is in part tuberculate. Larger of 2 valves studied was more developed and showed signs of tubercles in median and ventral areas also. Surfaces of valves and postero-ventral tubercles were covered with coarse and irregular reticulate pattern.

Internal features poorly preserved. Hinge tripartite, and in left valve has terminal sockets and median (?) smooth bar; impossible to say whether the hinge is lophodont or hemimerodont.

Remarks. To the original description Blake (1876, p. 432) added 'Elevated on the anterior and postero-ventral portions', which matches the most inflated parts of the specimens described here.

The genus is reminiscent of *Lophodentina*, from which it differs in shape, especially posteriorly, and in its tuberculate character. The 2 may well be closely related, although how closely is not possible to say without more details of the internal features. The resemblance to *Trachycythere* is also striking in shape and ornament in that both possess tubercles and reticulation, although of different strength. Sohn (1968, p. 14) postulated an evolutionary sequence of *Cornigella*–*Judahella*–*Trachycythere*–*Orthonotacythere* based on shape, size, ornament, and a suggested hinge development. It is conceivable that the species here described belongs to, or is an offshoot from, the lineage proposed by Sohn, but it is impossible to be certain. It is also possible that the Lower Rhaetic *Trachycythere? tuberosa* Anderson is also closely linked; however, on balance it would seem unlikely that Anderson's species belongs in *Trachycythere* [*sensu stricto*].

The material closely resembles *Cythere terquemiana* in its original description and in the original figure, which is an impression rather than an accurate representation, and the identification is regarded as fairly certain.

Suborder METACOPINA Sylvester-Bradley 1961

Superfamily HEALDIACEA Harlton 1933

Family HEALDIIDAE Harlton 1933

Genus OGMOCONCHA Triebel 1941

Type species. Ogmococoncha contractula Triebel 1941.

Remarks. It is inappropriate to discuss the details of the possible synonymy of the Lower Jurassic *Ogmococoncha* with the Triassic genus *Hungarella* Méhes (1911), and it is intended to examine this problem elsewhere. The name *Ogmococoncha* is employed because the genus was described from the Lower Jurassic and represents an important group of Lias ostracods to which the species described below certainly belong.

Ogmococoncha ellipsoidea (Jones 1872)

Plate 123, figs. 9–13

- 1872 *Bairdia* (?) *ellipsoidea* G. S. Brady MS, Jones, p. 146.
 1876 *Bairdia liassica* Brodie; Blake, p. 430, pl. 17, fig. 1.
 1938 Ostracode (521), Wicher, pl. 27, fig. 1.
 ?1952 *Ogmococoncha* sp. (1), Usbeck, p. 404, pl. 18, figs. 59a, b.
 ?1954 *Cytheridea ellipsoidea* (Jones, Brady MS) var. *reducta* Conti, p. 228, pl. 12, figs. 1–5.
 ?1954 *Cytheridea ellipsoidea* (Jones); Conti, p. 229, pl. 12, figs. 6–8.
 ?1958 *Healdia aspinata* Drexler, pp. 505, 506, pl. 21, figs. 5a–e; pl. 25, figs. 1–4.
 ?1959 Ostracoda B, Apostolescu, p. 817, pl. 2, figs. 20–23.
 ?1961 Ostracoda B, Apostolescu; Cousin and Apostolescu, p. 428, table 1.
 ?par. 1961 *Hungarella* sp. B (Apostolescu); G. Bizon, p. 433, table 2.
 ?1961 Ostracode sp. (200), Champeau, p. 438, table 3.
 ?1961 Ostracoda B, Apostolescu; Apostolescu, p. 448, table 4.
 ?par. 1961 *Hungarella* sp. B. (Apostolescu); J. J. Bizon, pp. 452, 455, table 5.
 ?1962 *Healdia aspinata* Drexler; Klingler, p. 79, table 7, pl. 12, figs. 1, 2.
 ?1964 *Ogmococonchella aspinata* (Drexler); Gründel, pp. 470, 477, figs. 5–7.
 ?1964 *Hungarella owthorpensis* Anderson, pp. 147, 148, pl. 14, figs. 96–101.
 non 1894 *Cytheridea ellipsoidea* (Jones); Jones, pp. 164, 165, pl. 9, figs. 6a–c.

Material. 97 carapaces, 518 valves.

Distribution. Redcar, samples R4, 8, 9, 11. North Cliffe, pit 'a' and hillside excavation. South Cliffe, pit 'b'. Hotham, pits 'g', 'h'. From *planorbis*, *angulata* and *bucklandi* zones.

<i>Dimensions</i> (in mm).		<i>Length</i>	<i>Height</i>	<i>Width</i>
Hotham, pit 'h'				
Left valve	HU.52.J.26	0.58	0.43	0.18
Right valve	HU.52.J.27	0.50	0.32	0.13
Right valve	HU.52.J.28	0.39	0.25	0.12
Right valve	HU.52.J.29	0.32	0.19	0.07
Hotham pit 'g'				
Carapace	HU.52.J.30	0.59	0.42	0.32
Left valve	HU.52.J.31	0.54	0.39	0.18
Left valve	HU.52.J.32	0.55	0.39	0.17
Right valve	HU.52.J.33	0.54	0.35	0.15
Right valve	HU.52.J.34	0.52	0.34	0.16
North Cliffe, pit 'a'				
Left valve	HU.52.J.35	0.59	0.42	0.18
Left valve	HU.52.J.36	0.59	0.43	0.19
Right valve	HU.52.J.37	0.55	0.36	0.14
Right valve	HU.52.J.38	0.56	0.36	0.14
Redcar, sample R11				
Carapace	HU.52.J.39	0.56	0.38	0.31
Left valve	HU.52.J.40	0.59	0.43	0.19
Right valve	HU.52.J.41	0.59	0.39	0.17
Right valve	HU.52.J.42	0.53	0.35	0.15
Right valve	HU.52.J.43	0.48	0.29	0.14

Diagnosis. Jones (1872, p. 146).

Description. Shape triangular, ovate. Dorsal margin asymmetrically arched with highest point posterior of mid-length; both anterior and posterior margins evenly rounded although slight angle may be evident at posterior end of dorsal margin; ventral margin straight. Greatest height posterior of mid-length, greatest length at mid-height, and greatest width close to posterior end. Valves inflated. Shape of right valve differs slightly from that of left described above in that it is less high and anterior portion of dorsal margin is inclined more steeply so that anterior margin is lower and more sharply rounded. Some variation in shape within species can be seen in degree of asymmetry of shell. Left valve larger than right, with strong overlap. Valve surface smooth. Valves normally thick and heavily calcified.

Muscle-scar pattern situated at, or just posterior of, mid-length; composed of 6 scars, which tend to be triangular in shape, within ring of 12 smaller scars. Inner lamella not properly known. Crenulated selvage of smaller (right) valve fits into prominent peripheral groove in larger valve. This contact groove is particularly well developed beneath anterior and posterior ends of dorsal margin, thus giving appearance of sockets in hinge structure, although the 2 strongly developed portions are joined by a weaker groove. Contact groove particularly weak anteriorly, just below junction of dorsal and anterior margins, and also in middle of ventral margin. Sexual dimorphism not observed. Pore canals not visible. A few instars possess weak postero-ventral spines.

Remarks. The name *Bairdia liassica* is derived from Brodie (1845, p. 80), who mentioned '*Cypris liassica*', but since this species was not described or figured it is therefore void

according to Anderson (1964, p. 133). Blake (1876, p. 430) considered *Bairdia ellipsoidea* Jones (1872) a synonym of his species *B. liassica*. Since '*Cypris liassica*' is a *nomen nudum* and the species described by Blake is synonymous with *B. ellipsoidea* Jones, Blake's name is incorrect and that of Jones has priority. *Cypris liassica* as described by Terquem (1854) from near Metz is the true species of this name and may be identical with the species regarded as *B. ellipsoidea* Jones in this work. It must be stressed that these conclusions are purely bibliographic; the problem of the actual similarity of *B. liassica* Blake and *B. ellipsoidea* Jones is discussed below. Although Blake considered *B. ellipsoidea* synonymous with *B. liassica*, to judge from the horizons at which Blake found *B. liassica* (1876, p. 430) it seems probable that he used the name for any vaguely rounded, triangular species of *Ogmoconcha*. The original material of *B. ellipsoidea* described by Jones was without doubt from the Hettangian of Yorkshire.

Troedsson (1951, p. 245) regarded *B. liassica* as synonymous with *Bairdia amalthei* (Quenstedt) (= *Cypris amalthei* Quenstedt 1858 = *Ogmoconcha amalthei* (Quenstedt) of Triebel 1950), and seems to have been unaware of Triebel's (1950) paper and his designation of a lectotype.

Jones's (1894, p. 164) description of *Cytheridea ellipsoidea* includes the following synonymy:

Bairdia ? *ellipsoidea* (G. S. Brady, MS) Jones 1872, p. 146.

Bairdia liassica (not Brodie's sp.) Blake 1876, p. 430, pl. 17, figs. 1 and 1a.

It is debatable whether *Bairdia liassica* (of Blake 1876) = *Bairdia* (?) *ellipsoidea* Jones 1872, is the same as *Cytheridea ellipsoidea* (Jones). The published illustrations show similarly shaped valves, but inspection of the material in the British Museum (Natural History) revealed that the specimen of *C. ellipsoidea* (Lower Lias, Westbury-on-Severn, Brodie Collection, I 6090) is unlike those of *B. liassica* (Blake Collection, D, no locality given; 3 carapaces and 1 valve).

The material described here is from the Hettangian of the area from which Jones described *Bairdia* (?) *ellipsoidea*, i.e. Cliffe, and is very closely comparable with both the original description (although Jones incorrectly orientated his specimens) and with the illustration given by Blake (1876, pl. 17, fig. 1). There is no doubt that this was the species described by Jones. A few specimens from Hotham (pit 'g') were slightly more rounded and show more similarity to one of Blake's illustrations (pl. 17, fig. 1a) than to the other.

From the synonymy it will be clear that 2 other species may also belong to this species. *Healdia aspinata* Drexler 1958 is at present the only species which Gründel (1964, pp. 469, 470) considered to belong in his genus *Ogmoconchella*, which is differentiated from *Healdia* and *Ogmoconcha* on muscle-scar patterns. The difference between the pattern of *Ogmoconcha* and Gründel's (1964, p. 477, fig. 7) drawing of the pattern in *Ogmoconchella* is in terms of the central group of muscle-scars which lie, in both cases, within a ring of small scars. In the latter genus the central scars are rounded, while in *Ogmoconcha* these scars may also be rounded but are frequently triangular. The central scars in *O. ellipsoidea* are of *Ogmoconcha* type, and tend to be triangular in shape. The author believes that the differences between the 2 patterns are insufficient to warrant splitting the genus. *Ogmoconchella aspinata* is from the Lias alpha of Germany and may well belong to *O. ellipsoidea*. Another species of similar form is *Hungarella owthorpensis*

Anderson (1964) from the English Rhaetic, in which is included 'Ostracoda B' Apostolescu (1959) from the Lower Lias of the Paris Basin. Anderson gave dimensions for the holotype only (L.—0.625 mm; H.—0.450 mm; W.—0.380 mm), which is larger than the present material of *O. ellipsoidea*. *H. owthorpensis* is differentiated from *B. liassica* in that the latter possesses a 'faintly punctate surface' (Anderson 1964, p. 148), but the material of *O. ellipsoidea* Jones (= *B. liassica*) from East Yorkshire is, in fact, quite smooth. *H. owthorpensis*, in the original figures, appears more inflated and possesses a more marked degree of overlap than *O. ellipsoidea*.

Some of the records quoted in synonymy from the Lias Colloque (1961) have a range from Hettangian to top Pliensbachian and are clearly omnibus records without great significance.

Apart from the species discussed above, *O. ellipsoidea* can be distinguished from other species of the genus by its shape, position of highest point on dorsal margin, degree of overlap, and degree of inflation.

Ogmoconcha hagenowi Drexler 1958

Plate 123, figs. 14–16

- 1952 *Bairdia* sp. (9), Usbeck, p. 406, pl. 19, fig. 68.
 1958 *Ogmoconcha hagenowi* Drexler, pp. 508–510, pl. 21, figs. 8a–f; pl. 26, figs. 1, 2.
 ?1959 Ostracoda A, Apostolescu, p. 816, pl. 1, figs. 9–11.
 1961 *Hungarella hagenowi* (Drexler); Pietrzenuk, p. 88.
 1962 *Ogmoconcha hagenowi* Drexler; Klingler, p. 80, table 7; pl. 12, fig. 4.
 1963 *Hungarella hagenowi* (Drexler); Oertli, pl. 7, fig. 2; pl. 8, figs. 1, 2.

Material. 224 carapaces, 508 valves.

Distribution. Redcar, samples R2, 3, 4, 5, 7, 8, 9, 10, 11.

<i>Dimensions</i> (in mm).		<i>Length</i>	<i>Height</i>	<i>Width</i>
Carapace	HU.52.J.44	0.73	0.56	0.42
Right valve	HU.52.J.45	0.68	0.48	0.20
Carapace	HU.52.J.46	0.54	0.38	0.29
Carapace	HU.52.J.47	0.48	0.34	0.28
Carapace	HU.52.J.48	0.43	0.28	0.21
Right valve	HU.52.J.49	0.69	0.50	0.22
Left valve	HU.52.J.50	0.73	0.55	0.23
Right valve	HU.52.J.51	0.67	0.48	0.26
Left valve	HU.52.J.52	0.70	0.50	0.25

Diagnosis. Drexler (1958, p. 509).

Description. Shape rounded, triangular. Dorsal margin strongly arched with highest point at, or anterior to, mid-length; anterior margin evenly rounded, merging without modification into dorsal margin and into convex ventral margin; posterior margin rounded but may show slight asymmetry.

Left valve distinctly larger than right, overlap fairly strong, but weak posteriorly and anteriorly. Position of greatest length at, or just below, mid-height, position of greatest height antero-medianly, and position of greatest width close to posterior end. Valve surface smooth, unornamented. In left (larger) valve there is a strong, crenulated contact furrow which received selvage of right valve. This contact groove strongest beneath crest of dorsal margin. Above contact groove on dorsal margin of left valve another